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Carcinoma of the Thoracic Esophagus

A Discussion of Early Diagnosis and Surgical Treatment

LYMAN A. BREWER III, M.D., and FRANK S. DOLLEY, M.D., *Los Angeles*

SUMMARY

Dysphagia, substernal or epigastric distress, and regurgitation of food are important early symptoms in the diagnosis of carcinoma of the esophagus. Temporary remission in symptoms does not rule out esophageal cancer. The use of thick barium meal and routine thorough examination of the esophagus in upright and supine positions in all *upper gastrointestinal roentgen studies, even though the clinical symptoms point to the upper abdomen, are of great importance.*

The spread of the cancer to both mediastinal and subdiaphragmatic lymph nodes makes transthoracic thoracolaparotomy the one approach which will permit the surgeon to perform a one-stage esophagogastrostomy, and to adequately evaluate and deal with cancerous tissue on both sides of the diaphragm. This one-stage procedure permits the patient to swallow normally after operation, and the costly and time-consuming uncertainties of the many-staged operations are avoided. The comfort which the operation gives to otherwise doomed patients, along with the improving postoperative mortality rate, offers new hope to those who have cancer of the esophagus.

OF all malignant disease, carcinoma of the esophagus is one of the most distressing to the patient because it produces progressive obstruction and slow starvation. This tumor comprises from 5 per cent to 10 per cent of all malignancies in males[13, 14] and is surpassed in frequency only by carcinoma of the stomach, lung, and rectum.[7] The past decade in this country has seen the first successful resection of the lower esophagus with esophagogastrostomy by Adams and Phemister[3] in 1938, and of upper thoracic carcinoma by Garlock[10] and Sweet[15] in 1944.

Despite these great surgical advances the number of operable cases seen by surgeons remains relatively small. In 1946 and 1947 the authors found only 30 per cent of cases of carcinoma of the esophagus treated by them to be operable. Other reports in the literature vary from 16 per cent of all cases[1] to 46 per cent of explored cases.[11] The explanation for the small number of resectable cases probably lies in delay in making the diagnosis rather than early metastasis, since it has been estimated that only 10 per cent of patients with esophageal cancer have definite metastasis when first examined by the physician.[2, 12] The late reference of these patients to the surgeon is explained partly by a fairly common medical belief, voiced in the literature as recently as 1945,[4] that carcinoma of the esophagus is not amenable to resection. Since these tumors are now subject to successful surgical treatment, the measures leading to an early diagnosis are of prime importance. It is the purpose of this communication, therefore, to discuss the early diagnosis and surgical management of carcinoma of the esophagus based on a study of cases observed and certain reports in the medical literature.

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SYMPTOMS AND SIGNS

In the majority of cases of carcinoma of the esophagus, it is possible to make the diagnosis soon enough to permit surgical extirpation. Certain few

cases, however, defy early diagnosis. Dysphagia is by far the most important symptom. It was present in all of a series of 30 patients treated in 1946 and 1947, and in 96 per cent of Farrell's series of 100.[8] In that series it occurred as the initial symptom in 71 instances. Physicians and laity alike should consider dysphagia as important as the finding of a lump in the breast, hemoptysis or other warning signs of early malignancy. Dysphagia may not necessarily be progressive; periods of remission may occur when the patient swallows better. This factor lulls both the patient and the physician into a false security that malignant disease is not present, and the diagnosis then may be "nervous stomach" or "cardiospasm." In six of the cases observed by the authors the fact that the dysphagia was not progressive resulted in delay in making the correct diagnosis.

Belladonna preparations should not be used until a definite diagnosis is made, since these drugs may decrease the smooth muscle spasm often present early with a tumor. In two cases in the authors' series, muscle spasm was relieved by belladonna so that the patients swallowed more easily and did not return to see their physician until some months later. It is possible also that simple necrosis of the tumor or the subsidence of the edema and swelling of a secondary esophagitis may also lessen the dysphagia. Although these explanations do not completely account for the surprising remissions of obstructive symptoms, the fact remains that remissions do occur. Unfortunately the esophageal obstruction may be severe and still not produce great dysphagia, for the effective diameter of the esophagus may be only 4 to 5 mm. and still permit the swallowing of solid foods with the help of a quantity of liquids.

Loss of weight, usually a prominent symptom, varied from a few pounds to 50 pounds in the series here reported, with an average loss of about 20 pounds. There is a corresponding lowering of the serum proteins and anemia of a secondary type. Great loss of weight may not mean extensive metastasis of the tumor as it usually does in connection with malignant disease elsewhere in the body.

Actual regurgitation of food was present in over half the cases in the authors' series and in 65 per cent of Farrell's cases.[8] This important symptom may be readily distinguished from true vomiting by the facts that with regurgitation of food there is no nausea, retching, nor bitter taste of gastric juice, and the regurgitated food is undigested.

In over half of the cases in the series here reported a slight feeling of distress, distention, or even pain on swallowing, was felt beneath the sternum or in the epigastrium. Distress of that kind is caused by the actual stretching of the esophagus and resultant hyperperistalsis. Because the distress is often felt by the patient below the xyphoid process, the clinician is erroneously led to believe that the pathological condition is in the stomach. One must be careful to distinguish this distress on swallowing from the continuous severe boring pain in the interscapular region of the back, which, when associated with fever, invariably means extensive spread to the mediastinal structures and inoperability. The occur-

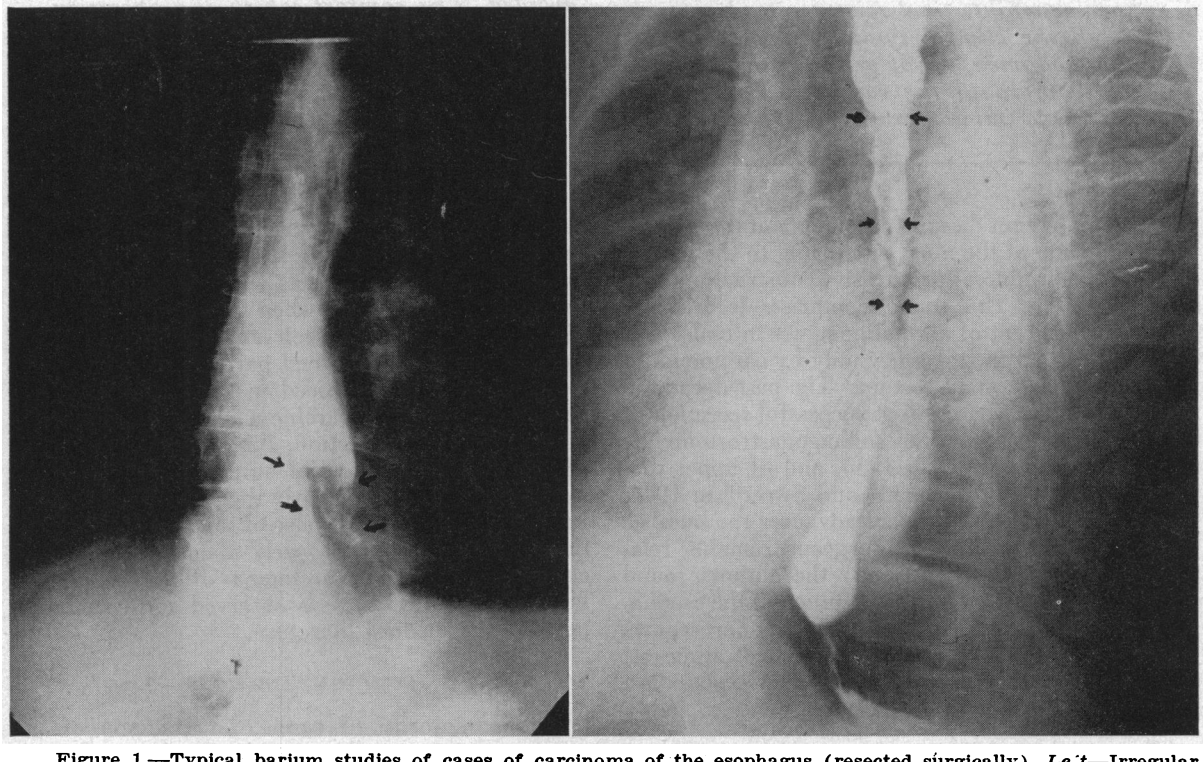

Figure 1.—Typical barium studies of cases of carcinoma of the esophagus (resected surgically). *Left*—Irregular filling defect of lower esophagus. *Right*—Irregular filling defect of upper esophagus.

rence of cough should be carefully investigated. In three of the cases in the series cough occurred immediately after ingestion of food, and was proven to be evidence of bronchial or tracheal involvement. It is interesting that chronic pneumonitis commonly seen in cases of cardiospasm from the aspiration of regurgitated food is rare in carcinoma of the esophagus. One patient with a long history of esophageal obstruction had pneumonitis of that order.

Physical findings show the results of progressive inanition and dehydration and are essentially those of a slow starvation. No other abnormal physical signs are elicited during the stage when the tumor is resectable. Other abnormal findings, which usually mean inoperability, will be discussed later under the consideration of the selection of patients for operation.

ROENTGENOGRAPHIC FINDINGS

The roentgenographic findings produced by the ingestion of thick barium meal usually reveal the signs pathognomonic of esophageal carcinoma. This examination is probably the most important one in determining the diagnosis and extent of the disease. The roentgenographic diagnosis depends upon changes produced by the tumor in contour, position and time of movement of the barium.[8, 9] These abnormalities involve more than one side of the tube when the growth is in the long axis or constrict the entire lumen when the growth is circumferential. It is usually possible to demonstrate some irregularity in contour of the lumen at the site of constriction by performing the fluoroscopic examination in the upright and supine positions. Some dilatation of the esophagus may be seen proximal to the obstruction, if it has been present for a long enough time. Figure 1 shows characteristic lesions. A real problem revolves around the fact that the physician asks for a roentgenological study of the stomach, expecting carcinoma of this organ, with little or no attention paid to the thoracic esophagus, the actual site of the growth. In over one-third of the cases in the authors' series, examination of the stomach was requested by the clinician as the first roentgenological study of the patient. Ofter very thin barium meal is used and supine examination omitted, so that an early lesion may be entirely missed. In Figure 2 (*left*) is seen an example of a case in which the main interest was in the stomach, so that the x-ray marker partially obscured the pathologic change high in the esophagus. The true diagnosis was finally determined two months later in this case, when an esophageal study was made (Figure 2 [*right*]).

The confusion of carcinoma of the esophagus with "esophagospasm" represents another serious problem in roentgen diagnosis. Figure 3 (*left*) illustrates a case in which the diagnosis of "spasm" of the esophagus resulted in a six-month delay in detection of the carcinoma. Figure 3 (*right*) shows the similarity to a proven case of benign spasm. Persistent

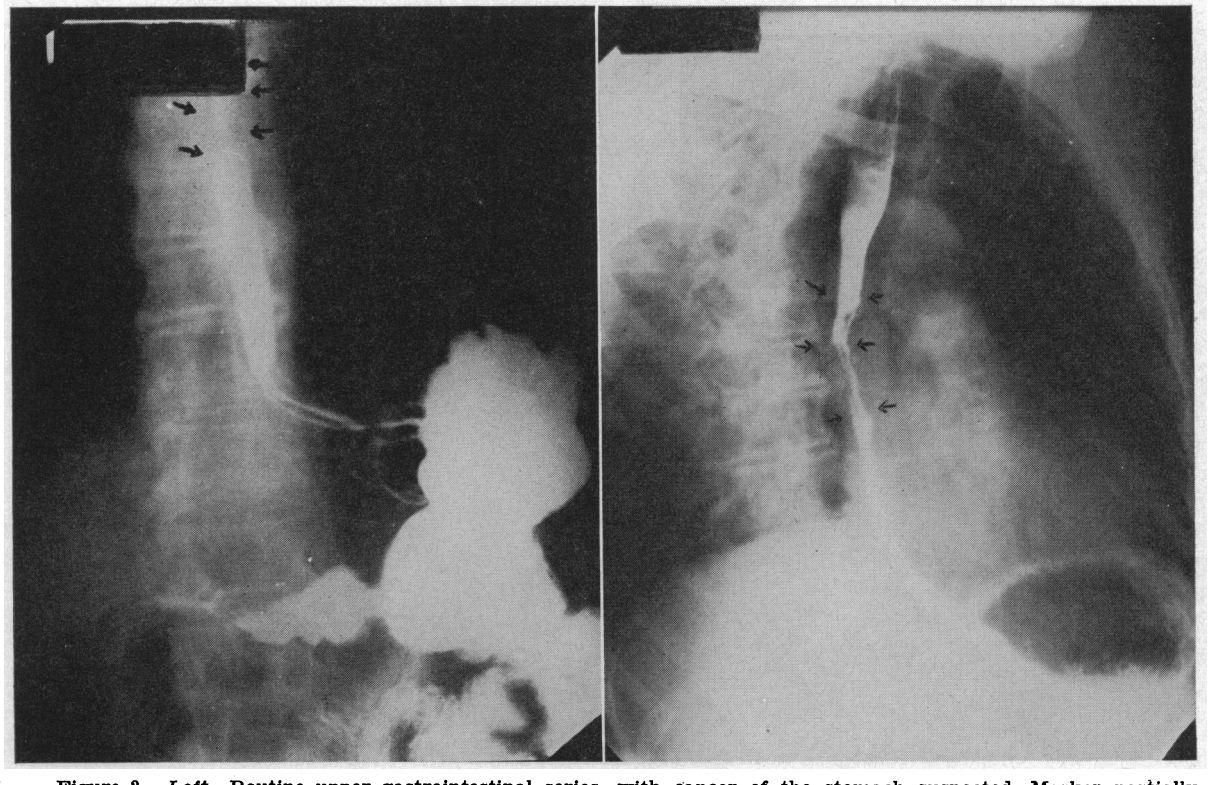

Figure 2.—*Left*—Routine upper gastrointestinal series, with cancer of the stomach suspected. Marker partially obscured esophageal lesion and "normal esophagus" was reported. *Right*—Film two months later demonstrates carcinoma of the esophagus.

dysphagia due to benign tumors of esophagus or benign strictures may simulate carcinoma of the esophagus, particularly if mucosal ulceration is present. However, one must remember that carcinoma may develop in cases of "cardiospasm" and benign stricture after a long period of time.[6] Figure 4 (*left*) represents an obstructive lesion of the esophagus proven to be a benign stricture, while the obstruction shown in Figure 4 (*right*) was shown to be a benign tumor. Both of these lesions were successfully resected by a one-stage transthoracic procedure. Extra-esophageal masses may also simulate an intrinsic growth.[9] Diverticula and varices only rarely result in roentgenological findings that may cause them to be confused with primary esophageal carcinoma.

ESOPHAGOSCOPY

Esophagoscopy is the next important diagnostic aid in determining the presence of a primary esophageal carcinoma. The tumor may be studied under direct vision, a biopsy taken, and the amount of fixation of the esophagus noted. A rigidly fixed esophageal wall usually means direct extension of the tumor into the extra-esophageal tissues, although, if there is periesophagitis, this finding is not absolute. The external appearance of the lesion is so characteristic that the experienced endoscopist usually can make the diagnosis by gross examination alone.

With adequate sedation and gentleness of manipulation of the instruments, esophagoscopy may be performed on the average patient without undue discomfort. In addition to local anesthesia and preoperative barbiturate and atropine, the injection of 50 to 100 mgm. of Demerol intravenously produces considerable relaxation and greatly lessens the discomfort to the patient. If the patient is unduly apprehensive, general anesthesia (ether or pentothal and curare) can be safely used, and the diagnosis of carcinoma will not then be overlooked.

INDICATIONS FOR SURGICAL EXPLORATION

Patients with carcinoma of the esophagus who are seen by surgeons are most often starved old men. Loss of weight, so indicative of extensive spread of cancer in other parts of the body, must not be interpreted as a sign of inoperability of esophageal carcinoma, provided the nutritional deficiencies can be corrected. Age itself is not a contraindication to operation, as patients in their 70's and 80's have had successful esophageal resections. All patients with carcinoma in the region of the aortic arch should be examined with a bronchoscope to determine involvement of the bronchus or trachea with the esophageal carcinoma. Spread to the lungs, although not common, when shown by a roentgenogram of the chest, is a contraindication to operation. Similarly, involvement of the mediastinum, as determined by roentgen films showing gross enlargement of the mediastinal lymph nodes, or as evidenced by persistent fever over 100° F. when accompanied by a boring interscapular pain, should be regarded as contraindication to operation. Hoarseness due to

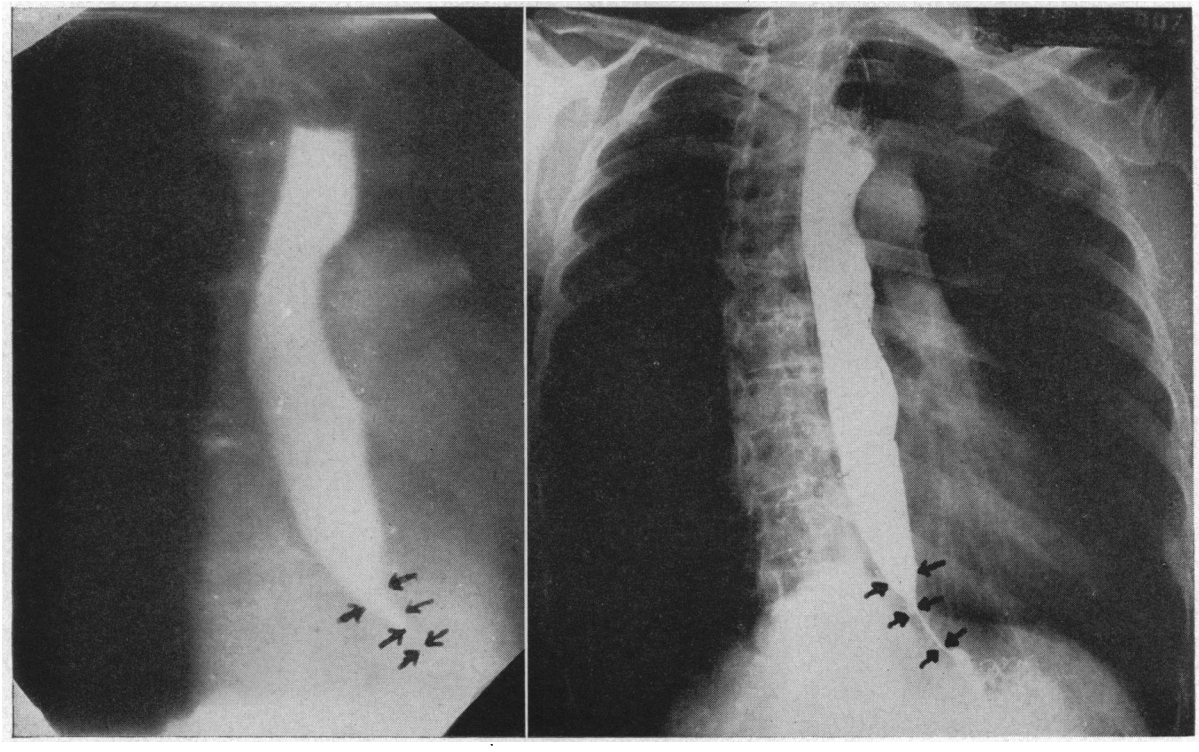

Figure 3.—*Left*—Carcinoma of the esophagus simulating benign spasm. There was six months' delay in making diagnosis because of neglect to perform esophagoscopy. *Right*—Similarity of x-ray findings seen in this proven case of benign spasm of the esophagus.

recurrent laryngeal paralysis similarly indicates mediastinal extension of the tumor. Palpable cervical lymph nodes, enlarged liver, evidence of involvement of the peritoneum and other signs of distant metastasis also contraindicate surgical exploration.

SURGICAL TREATMENT

A detailed account of the surgical technique employed by the authors has been presented in a previous report.[5] The reader is further referred to the earlier writings of Adams and Phemister,[3] Garlock,[10] and Sweet,[15] who have made the great surgical contributions to the present-day treatment of this disease in this country. In the authors' view, transthoracic thoracolaparotomy, in which the stomach is brought up through the incised diaphragm into the pleural cavity to replace the resected esophagus, is the surgical procedure of choice.[5] At one operation the local and lymphatic spread of the cancer both in the thorax and upper abdomen can be exposed, the resectability determined, the cancer excised, and the anastomosis of the stomach and esophagus performed. The success of the operation depends on adequate preparation of the patient, careful surgical technique, intratracheal anesthesia, prevention of operative shock by blood replacement, and diligent postoperative care to prevent or treat postoperative pulmonary complications.

RESULTS OF OPERATION

No patients are more grateful following operation than these starved, elderly persons with cancer of the esophagus, who find that they can swallow normally after a one-stage operation. Actually the presence of the stomach in the thoracic cavity, because it causes only slight compression of the left lung, produces little if any discomfort. Figure 5 shows the postoperative x-ray film in a case in which the stomach was brought up to the upper part of the chest to replace the cancer-bearing esophagus. X-ray therapy, thus far, has not offered such relief. The authors have not encountered postoperative strictures at the site of the anastomosis. The food passes readily into the stomach. Delayed emptying of the stomach occasionally occurs, but is most often a temporary complication. In the 30 cases treated in 1946 and 1947 the cancer was located just below or above the arch of the aorta in 22 instances, and in eight cases in the region of the diaphragm. Explorations were done in 23 cases; one patient for whom operation was considered advisable refused to permit it. In 14 instances among the 23 cases in which operation was done, the tumor could not be removed; resection was carried out in the remaining nine cases. There were two postoperative deaths. The patients were males, aged 65 and 69 years, with arteriosclerotic heart disease in which bilateral pleural effusion, pulmonary edema, partial atelectasis and auricular fibrillation caused death. Other observers report mortality rates from 16 per cent[15] to 44 per cent.[1] The higher mortality was reported in an earlier period when penicillin and streptomycin were not available. With improvements in surgical management, even lower mortality rates may be anticipated. Survival time after operation varied in

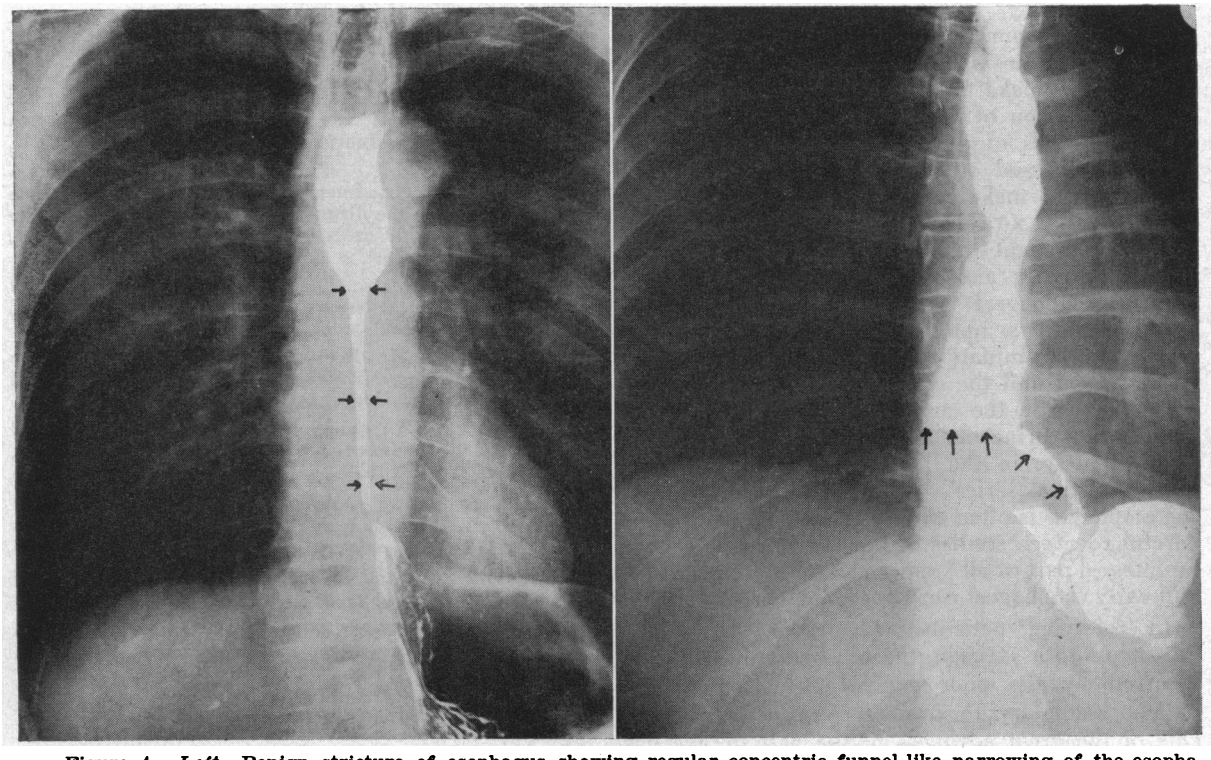

Figure 4.—*Left*—Benign stricture of esophagus showing regular concentric funnel-like narrowing of the esophageal lumen. *Right*—Benign leiomyoma of esophagus with smooth shelf-like obstruction of the esophageal lumen.

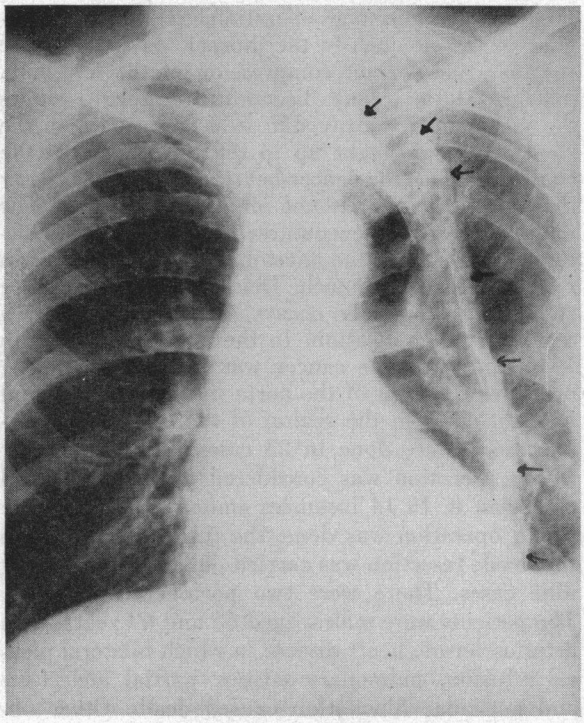

Figure 5.—Postoperative film showing esophagogastrostomy with the stomach anastomosed to the upper thoracic esophagus at the thoracic inlet.

the authors' series from six to 20 months; in other series it has ranged up to seven and a half years.[15]

DISCUSSION

Since carcinoma of the esophagus is accessible for early diagnosis, there is a challenge to every physician to make this diagnosis in time for complete extirpation of the lesion. Failure to make an early diagnosis of carcinoma of the esophagus is most often based on two common mistakes: (1) Neglecting to make a careful examination of the esophagus by x-ray because the epigastric symptoms are thought to be caused by gastric pathological changes; and (2) making a clinical diagnosis of esophageal "spasm" because there are remissions of the symptoms. In performing the roentgenological examination, a thick barium meal must be employed and the esophagus viewed in at least three planes, in the supine as well as the upright positions, to bring out any irregularity of the wall. Unfortunately, in the performance of "an upper gastrointestinal series" a thorough examination of the esophagus is often tragically omitted. Only when careful roentgen studies of the esophagus are made an integral part of all "upper gastrointestinal series" will early esophageal cancers be diagnosed.

In referring patients with carcinoma of the esophagus to a surgeon, the physician must not be deterred by the poor general condition of the patient secondary to pronounced loss of weight. One of the great advances of the past decade has been the emphasis upon restoring protein, vitamin and glucose and water deficiencies before submitting the patient to operation. Thus, even "the starved old men" may be made successful candidates for operation. Proper anesthetic management, blood replacement during operation and the performance of a meticulous anastomosis contribute greatly to the success of the operation. Prophylaxis with antibiotics and care to avoid and control postoperative intrathoracic complications will further insure a satisfactory postoperative result. The success of the operation to a large extent depends on the prevention and the skillful management of the postoperative pulmonary complications. Supravoltage x-ray therapy may increase the survival period when used following radical removal of the cancer.

1930 Wilshire Boulevard.

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